Public Review Comment Matrix

Originating Office: AIR-6B0	**Document Description:** TSO-C117b, Airborne Windshear Warning And Escape Guidance Systems For Transport Airplanes	**Project Lead/Reviewer** Lee Nguyen	**Reviewing Office:** **AIR-6B1**	**Date of Review:** 27 Mar 2018

	Commenter	**Section # and Page #**	**Comment**	**Suggested Change and Rationale**	**Disposition**
1.	Rockwell Collins	Appendix 1 Item 4(d)(10) Pages 1-17 and 1-18	The comparison testing to a 15 degree fixed pitch is best performed in a desktop simulation environment due to its repeatability capability. Section 4(d)(10)(i) including (a), (b) and (c) are performed in the desktop environment. Repeating each condition 5 times on the desktop simulation is not of any benefit. It makes sense to simulate these with horizontal, vertical and then combined shear conditions to ensure the algorithm can handle all combinations.	Add a note or clarification that the 15 degree fixed pitch does not need to be shown in the simulator testing since 4(d)(10)(i) is covered by desktop simulation. Update summary and notes to allow desktop to be used for 4(d)(10)(i). Remove requirement to repeat each test condition 5 times when using desktop simulation. The 30 TSO shear conditions each (i.e., 10 down draft radii × vert/horiz/combined) for approach and takeoff (thus 60 separate conditions) may be run with multiple weight / CG variations if needed.	Accepted. Added the following text after § 4(d)(10)(i): You may reduce the number of times you repeat each of these tests conditions below five. To reduce the number of repetitions below five you must have gathered sufficient data to demonstrate the flight path guidance commands meet these requirements. You should also include aircraft weight and center of gravity variations if applicable.

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2.	Rockwell Collins	Appendix 1 Item 4(d)(10) Pages 17 and 1-18	Simulator testing is often performed with multiple pilots using both vertical and horizontal shear components. Running these tests with just horizontal or just vertical is not very beneficial. Sections 4(d)(10)(ii) through (vii) are confirmed in the pilot in the loop simulation.	Add wording to indicate that Sections 4(d)(10)(ii) through (vii) should be evaluated using the combined vertical and horizontal shear components.	Accepted. Added the following note after § 4(d)(10)(i)(c): **Note:** There is no requirement to perform the tests described in §§ 4(d)(10)(ii) through (vii) with horizontal only, vertical only, and combination vertical and horizontal shear conditions. You may perform the tests described in §§ 4(d)(10)(ii) through (vii) with only the combination vertical and horizontal shear conditions.
3.	GAMA	Section 7.c., Page 6	GAMA appreciates the changes introduced by the revision to the TSO to address concerns with the Order 8150.1D Appendix G TSO Template. We request that the Order 8150.1D Appendix G TSO Template is updated to reflect the language used within this section.		Acknowledged.
4.	GAMA	Appendix 1, Section 4.b.(3)(iv) &	GAMA suggests the creation of a new section applicable to both caution and warning alerts. Move		Accepted. Added new paragraph 4.b.(5)

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		(4)(iv), Page 1-5	paragraphs 4.b.(3)(iv) and 4.b.(4)(iv) to this new section that describes shear intensity level modifications that can be made in approach and takeoff scenarios - increasing the probability of providing timely windshear alerts is applicable to both caution and warning alerts, so this paragraph should be made applicable to both.		Windshear Alert with Increased Approach Sensitivity and Reduced Takeoff Sensitivity Modes, and moved paragraphs 4.b.(3)(iv) and 4.b.(4)(iv) to this new paragraph.
5.	GAMA	Appendix 1, Section 4.b.(3)(iv), Page 1-5	Consider changing 'escape guidance' to 'windshear alerts'		Accepted. Changed "escape guidance" to "windshear alerts" in the new paragraph 4.b.(5)(i).
6.	GAMA	Appendix 1, Sections 4.b.(3)(iv) and 4.b.(4)(iv), Page 1-5	GAMA recommends allowing for temporarily inhibiting the reactive windshear alerting system during performance takeoff situations where the aircraft is already in an escape configuration. We recommend including this allowance in the above new section that describes shear intensity level modifications that can be made in approach and takeoff		Partially accepted. We agreed to update the TSO performance requirements reducing nuisance alerts during high-performance takeoff scenarios. Instead of allowing for temporarily inhibiting the reactive windshear alerting system, we allowed for additional reduced takeoff

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			scenarios.		sensitivity mode. We added the for additional reduced takeoff sensitivity mode requirement in the same new section that describes shear intensity level modifications that can be made in approach and takeoff scenarios. Added paragraph 4.b.(5)(iii) in Appendix 1 to read as follows: 4.b.(5)(iii) Additional Reduced Takeoff Sensitivity Mode. Some high performance jet aircraft receive unwanted windshear alerts after takeoff when climbing at high rates through atmospheric wind gradients. If these unwanted alerts risk desensitizing pilots to windshear alerting, you may tailor the floor of the shear intensity must alert curve in Figure 1 to reduce these unwanted alerts under the following conditions: (a) The airborne windshear warning and escape guidance

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					system can determine the aircraft is in the takeoff versus approach phase. (b) The aircraft is climbing at a high rate of climb, the aircraft continues to climb at a high rate, and the rate of climb is known to create unwanted windshear alerts. (c) The aircraft power setting is at or near a level representative of the maximum for the segment of the takeoff, for example maximum takeoff thrust. (d) The Figure 1 shear intensity must alert curve must be complied with after takeoff. (See comment 12)
7.	Garmin	Section 3.b.(3) Page 2	Paragraph 3.b.(3) includes the statement: Design the system to at least the above failure condition classifications.	Suggest changing to the alternate wording identified in paragraph 3.b. of the TSO Template in Order 8150.1D Appendix G.	Not accepted. The FAA feels the minimum failure condition classification is appropriate for this TSO.

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			Wording needs to change to allow failure condition to be determined at the aircraft level. This statement implies the failure condition classification of an appliance is determined by the TSO regardless of mitigations employed to meet aircraft level safety requirements such as redundant appliances/systems. Unless the DAL cannot be affected by the installation, the aircraft System Safety Assessment should determine the failure classification and by extension, the design assurance level (DAL) requirement. The AFHA/SFHA/PASA/PSSA ultimately determines the DAL requirement for a particular installation. Specifying the DAL at the appliance level without the benefit of the specific AFHA/SFHA/PASA/PSSA means that in some cases the DAL will undoubtedly be higher and more		

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			costly than necessary. This will have a chilling effect on the installation of new, safety enhancing technologies since the cost will be greater than necessary. It is possible to build and certify a TSOA appliance that cannot be approved for installation in one or more aircraft types because it does not have the required DAL. Similarly, just because the appliance meets a TSO DAL does not mean it can be approved for installation. We recommend that no failure classification/DAL requirement be included in a TSO when the installation can affect or mitigate the hazard level and therefore consideration should be given to revising paragraph 3.c in this TSO to the general guidance in the Recommendation column.		
8.	Garmin	Section 7.c. Page 6	Section 7.c. includes the following: If the article contains software, include one copy of the Open Problem Report	Garmin applauds the language within this draft TSO as addressing concerns with the Order 8150.1D Appendix G TSO Template identified in the	Acknowledged.

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			(OPR) summary to type certification, supplemental type certification, or amended type certification design approval holders. This is inconsistent with the Order 8150.1D Appendix G TSO Template. However, the TSO Template considers this "furnished data" that is required to be provided to any "entity (such as an operator or repair station)". Operators and repair stations typically do not have the same capability as a TC/STC design approval holder to make an appropriate assessment of OPR effect. Consequently, it will only serve to cause confusion to require an OPR summary to be provided to operators and repair stations. This same concern has been raised in the context of the FAA/EASA/Industry A(M)C 20-OPR discussions.	Comment. No change suggested to the draft TSO but suggest updating Order 8150.1D Appendix G TSO Template.	

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9.	Garmin	Appendix 1, Section 4.b.(3)(iv), Page 1-5	Section 3 (Windshear Caution Alert) includes the statement: (iv) Increased Approach Sensitivity Mode. If your system separates approach and takeoff scenarios, you may reduce the shear intensity level in the approach mode to increase the probability of providing timely escape guidance. You may lower the floor of the shear intensity curve must alert curve in Figure 1 from 0.105 to 0.090. If you lower the floor, you may also modify the turbulence rejection tests in paragraph 4.d.7.(ii) such that an alert in this region is not a failure of the turbulence rejection test. The placement of this text is confusing. The placement of this paragraph implies it is only applicable to caution alerts. However, the contents of the paragraph do not specify that only caution alerts are affected (in	Move paragraphs 4.b.(3)(iv) and 4.b.(4)(iv) to a new section that describes shear intensity level modifications that can be made in approach and takeoff scenarios. The new section would be applicable to both caution and warning alerts. Increasing the probability of providing timely windshear alerts is applicable to both caution and warning alerts, so this paragraph should be made applicable to both. Additionally, correct the reference to paragraph “4.d.7.(ii)” to “4.d.(7)(ii)” to be consistent with the actual paragraph number scheme.	Accepted. Added new paragraph 4.b. (5) Windshear Alert with Increased Approach Sensitivity and Reduced Takeoff Sensitivity Modes, and moved paragraphs 4.b.(3)(iv) and 4.b.(4)(iv) to this new paragraph. (See comment 4) Corrected the reference to paragraph “4.d.7.(ii)” to “4.d.(7)(ii)”.

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			contrast, sibling paragraphs i - iii do refer to caution alerts).		
10.	Garmin	Appendix 1, Section 4.b.(3)(iv), Page 1-5	The paragraph contains the following text: "you may reduce the shear intensity level in the approach mode to increase the probability of providing timely escape guidance." The inclusion of "escape guidance" is confusing in this paragraph. This paragraph is contained in section (3) Windshear Caution Alert and is applicable to reactive windshear systems without escape guidance.	Change "escape guidance" to "windshear alerts"	Accepted. Changed “escape guidance” to “windshear alerts”. (See comment 5) Note. This text is now in Section 4.b.(5)(i)
11.	Garmin	Appendix 1, Section 4.b.(4)(iv), Page 1-5	Section 4 (Windshear Warning Alert) includes the statement: Reduced Takeoff Mode Sensitivity: If your system separates approach and takeoff scenarios, you may desensitize the takeoff mode to reduce the probability of unwanted	Move paragraphs 4.b.(3)(iv) and 4.b.(4)(iv) to a new section that describes shear intensity level modifications that can be made in approach and takeoff scenarios. The new section would be applicable to both caution and	Accepted. Added new paragraph 4.b. (5) Windshear Alert with Increased Approach Sensitivity and Reduced Takeoff Sensitivity Modes, and moved paragraphs 4.b.(3)(iv) and 4.b.(4)(iv) to this new paragraph.

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			alerts. You may raise the floor of the shear intensity must alert curve in Figure 1 from 0.105 to 0.120. The placement of this text is confusing. The placement of this paragraph implies it is only applicable to warning alerts. However, the contents of the paragraph do not specify that only warning alerts are affected (in contrast, sibling paragraphs i - iii do refer to warning alerts).	warning alerts. Increasing the probability of providing timely windshear alerts is applicable to both caution and warning alerts, so this paragraph should be made applicable to both.	(See comments 4 and 9)
12.	Garmin	Appendix 1, Sections 4.b.(3)(iv) and 4.b.(4)(iv), Page 1-5	Garmin has observed reactive windshear nuisance alerts during high-performance takeoff scenarios. The aircraft is flaps up, at or near maximum power, and has an elevated climb rate, but is climbing through atmospheric wind gradients quickly enough to exceed the shear intensity curve "MUST ALERT" zone.	Garmin recommends allowing for temporarily inhibiting the reactive windshear alerting system during performance takeoff situations where the aircraft is already in an escape configuration. Recommend including this allowance in the same new section that describes shear intensity level modifications that can be made in approach and takeoff scenarios.	Partially accepted. We agreed to update the TSO performance requirements reducing nuisance alerts during high-performance takeoff scenarios. Instead of allowing for temporarily inhibiting the reactive windshear alerting system, we allowed for additional reduced takeoff sensitivity mode. We added the for additional reduced takeoff

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					sensitivity mode requirement in the same new section that describes shear intensity level modifications that can be made in approach and takeoff scenarios. Added paragraph 4.b.(5)(iii) in Appendix 1 to read as follows: 4.b.(5)(iii) Additional Reduced Takeoff Sensitivity Mode. Some high performance jet aircraft receive unwanted windshear alerts after takeoff when climbing at high rates through atmospheric wind gradients. If these unwanted alerts risk desensitizing pilots to windshear alerting, you may tailor the floor of the shear intensity must alert curve in Figure 1 to reduce these unwanted alerts under the following conditions: (a) The airborne windshear warning and escape guidance system can determine the aircraft is in the takeoff versus approach

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					phase. (b) The aircraft is climbing at a high rate of climb, the aircraft continues to climb at a high rate, and the rate of climb is known to create unwanted windshear alerts. (c) The aircraft power setting is at or near a level representative of the maximum for the segment of the takeoff, for example maximum takeoff thrust. (d) The Figure 1 shear intensity must alert curve must be complied with after takeoff. (See comment 6)
13.	Garmin	Section 1:	Disconnects exist between the TSO text and the TSO Template in Order 8150.1D Appendix G. For comments 13 to 32, suggested changes are to add bold underlined text from template and remove strikethrough text:	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: This technical standard order (TSO) is for manufacturers applying for a TSO authorization (TSOA) or letter

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			This technical standard order (TSO) is for manufacturers applying for a TSO authorization (TSOA) or letter of **TSO** design approval (LODA).		of TSO design approval (LODA).
14.	Garmin	Section 3.e	Software Qualification. If the article includes software, develop the software according to RTCA, Inc., ~~D~~**d**ocument~~,~~ **RTCA/**DO-178C, Software Considerations in Airborne Systems and Equipment Certification, dated December 13, 2011, including referenced supplements as applicable, to at least the software level consistent with the failure condition classification defined in paragraph 3~~.~~b of this TSO. You may also develop the software according to RTCA, Inc.**,** ~~D~~**d**ocument **RTCA/**DO-178B, dated December 1, 1992, ~~only when following~~ **if you follow** the guidance in AC 20-115~~C~~**D**, Airborne Software **Development** Assurance **Using EUROCAE ED-12( ) and RTCA DO-178( )**, dated July ~~19~~**21**, ~~2013~~**2017**, or latest revision.	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: You may also develop the software according to RTCA, Inc., document RTCA/DO-178B, dated December 1, 1992, if you follow the guidance in AC 20-115D, *Airborne Software Development Assurance Using EUROCAE ED-12() and RTCA DO-178()*, dated July 21, 2017, or latest revision.

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15.	Garmin	Section 3.f	Electronic Hardware Qualification. If the article includes complex custom airborne electronic hardware, **then** develop the component according to RTCA, Inc., Document **RTCA/**DO-254, Design Assurance Guidance for Airborne Electronic Hardware, ~~dated April 19, 2000,~~ to at least the design assurance level consistent with the failure condition classification defined in paragraph 3.b of this TSO. For custom airborne electronic hardware determined to be simple, DO-254, paragraph 1.6 applies.	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Partially accepted. We did not delete the date for DO-254. Other instances of RTCA document references in this TSO include the date, thus for consistency, we did not delete the date. We will submit this for an update the TSO template. Revised the paragraph to read as follows: Electronic Hardware Qualification. If the article includes complex custom airborne electronic hardware, then develop the component according to RTCA Inc., Document RTCA/DO-254, Design Assurance Guidance for Airborne Electronic Hardware, dated April 19, 2000, to at least the design assurance level consistent with the failure condition classification defined in paragraph 3.b of this TSO.

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16.	Garmin	Section 3.g	Deviations. We have provisions for using alternate or equivalent means of compliance with the criteria in the MPS of this TSO. If you invoke these provisions, you must show that your equipment maintains an equivalent level of safety. Apply for a deviation pursuant to ~~Title 14 of the Code of Federal Regulations (~~14 CFR~~)~~ ~~§~~ 21.618.	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: ….. Apply for a deviation pursuant to 14 CFR 21.618.
17.	Garmin	Section 4.a	Mark at least one major component permanently and legibly with **of** all the information in 14 CFR ~~§~~ 45.15(b).	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: Mark at least one major component permanently and legibly with all of the information in 14 CFR ~~§~~ 45.15(b).
18.	Garmin	Section 4.c	You may use electronic part marking to identify software or **airborne** electronic hardware components by embedding the identification within	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows:

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			the hardware component itself (using software) rather than marking it on the equipment nameplate. If electronic marking is used, it must be readily accessible without the use of special tools or equipment.		You may use electronic part marking to identify software or airborne electronic hardware components by embedding the identification within the hardware component itself (using software) rather than marking it on the equipment nameplate.
19.	Garmin	Section 5.a.(1)	Operating instructions and article limitations sufficient to describe the ~~article's~~ **equipment's** operational capability.	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: Operating instructions and article limitations sufficient to describe the equipment's operational capability.
20.	Garmin	Section 5.a.(2)	~~Describe in detail~~ **Detailed description of** any deviations.	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: Detailed description of any deviations.

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21.	Garmin	Section 5.a.(3)	Installation procedures and limitations sufficient to ensure that the airborne windshear warning and escape guidance system, when installed according to the installation or operational procedures, still meets this TSO's requirements. Limitations must identify any unique aspects of the installation. The limitations must **also** include a note with the following statement: ~~Note:~~ "This article meets the minimum requirements of TSO-C117b. Installation of this article requires separate approval."	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: The limitations must also include a note with the following statement: "This article meets the minimum requirements of TSO-C117b. Installation of this article requires separate approval."
22.	Garmin	Section 5.a.(5)	A summary of the test conditions used for environmental qualifications for each component of the article. For example, a form as described in **RTCA/**DO-160G, Environmental Conditions and Test Procedures for Airborne Equipment, Appendix A.	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: For example, a form as described in RTCA/DO-160G, Environmental Conditions and Test Procedures for Airborne Equipment, Appendix A.

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23.	Garmin	Section 5.c	If the article includes software: a plan for software aspects of certification (PSAC) software configuration index, and **a** software accomplishment summary.	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: If the article includes software: a plan for software aspects of certification (PSAC) software configuration index, and a software accomplishment summary.
24.	Garmin	Section 5.f	Identify functionality **or performance** contained in the article not evaluated under paragraph 3 of this TSO (defined as non-TSO functions). Non-TSO functions can be accepted in parallel with the TSOA. For those non-TSO functions to be accepted, you must declare these functions and include the following information with your TSO application:	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Partially Accepted. Removed "or performance" based on previously accepted Garmin comments to other TSOs We will submit this for an update the TSO template. Revised the paragraph to read as follows: Identify functionality contained in the article not evaluated under paragraph 3 of this TSO (defined as non-TSO functions).

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25.	Garmin	Section 5.f.(5)	Test plans and analysis, as appropriate, to verify that **the** performance of the hosting TSO article is not affected by the non-TSO function(s).	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: Test plans and analysis, as appropriate, to verify that the performance of the hosting TSO article is not affected by the non-TSO function(s).
26.	Garmin	Section 5.f.(6)	Test plans and analysis, as appropriate, to verify **that** the function and performance of the non-TSO function(s) as described in paragraph 5.f.(1).	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: Test plans and analysis, as appropriate, to verify that the function and performance of the non-TSO function(s) as described in paragraph 5.f.(1).
27.	Garmin	Section 5.g	The quality manual required by 14 CFR ~~§~~ 21.608, including functional test specifications. The quality system must ensure that you will detect any change to the approved	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows:

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			design that could adversely affect compliance with the TSO MPS and reject the article accordingly. Applicants who currently hold TSOAs must submit revisions to the existing quality manual as necessary (not required for LODA applicants).		Paragraph 5.g.: The quality manual required by 14 CFR ~~§~~ 21.608, ….
28.	Garmin	Section 5.h	A description of your organization as required by 14 CFR ~~§~~ 21.605.	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: Paragraph 5.h.: A description of your organization as required by 14 CFR ~~§~~ 21.605.
29.	Garmin	Section 6.f	The results of the environmental qualification tests conducted according to paragraph 3.d of this TSO.	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Not accepted. To keep consistency throughout the entire TSO, we used the period between the paragraph number and subparagraph letter, e.g. 3.b. The TSO template has several formatting inconsistencies in this area. We have highlighted these inconsistencies for possible

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					correction in the next TSO template.
30.	Garmin	Section 6.g	If the article includes software, the appropriate documentation defined in **RTCA/**DO-178B or **RTCA/**DO-178C specified in paragraph 3.e of this TSO, including all data supporting the applicable objectives in Annex A, Process Objectives and Outputs by Software Level of DO-178B or DO- 178C.	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: If the article includes software, the appropriate documentation defined in RTCA/DO-178B or RTCA/DO-178C specified in paragraph 3.e of this TSO, …..
31.	Garmin	Section 6.h	If the article includes complex custom airborne electronic hardware, the appropriate hardware life-cycle data in combination with ~~the~~ design assurance level, as defined in **RTCA/**DO-254, Appendix A, Table A-1. For simple custom airborne electronic hardware, the following data are required: test cases or procedures, test results, test coverage analysis, tool assessment and qualification data, and configuration management records, including	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: If the article includes complex custom airborne electronic hardware, the appropriate hardware life-cycle data in combination with ~~the~~ design assurance level, as defined in RTCA/DO-254, Appendix A, Table A-1.

Public Review Comment Matrix

Originating Office: AIR-6B0	Document Description: TSO-C117b, Airborne Windshear Warning And Escape Guidance Systems For Transport Airplanes	Project Lead/Reviewer Lee Nguyen	Reviewing Office: AIR-6B1	Date of Review: 27 Mar 2018

	Commenter	Section # and Page #	Comment	Suggested Change and Rationale	Disposition
			problem reports.		
32.	Garmin	Section 7.a	~~If~~ **When** furnishing one or more articles manufactured under this TSO to one entity (such as an operator or repair station), provide one copy or online access to the data in paragraphs 5.a and 5.b of this TSO. Add any other data needed for the proper installation, certification, use, or continued compliance with the TSO, of the airborne windshear warning and escape guidance system.	Suggested changes are to add bold underlined text from template and remove strikethrough text.	Accepted. Revised the paragraph to read as follows: When furnishing one or more articles manufactured under this TSO to one entity (such as an operator or repair station), provide one copy or online access to the data in paragraphs 5.a and 5.b of this TSO.
33.	Embraer S.A.	Section # 4.b (6); page 1-6	Reactive windshear alert prioritization should be harmonized with FAA AC 20-182A (Airworthiness Approval for Aircraft Weather Radar Systems).	**The text:** *"(6) The reactive windshear systems caution alert must be disabled if a forward-looking windshear system is in operation."* **Should be changed to:** *(6) The reactive windshear systems caution alert should be disabled if a forward-looking windshear system is in operation.*	Accepted. Changed as suggested.

Public Review Comment Matrix

Originating Office:	Document Description: TSO-C117b, Airborne Windshear Warning And Escape Guidance Systems For Transport Airplanes	Project Lead/Reviewer	Reviewing Office:	Date of Review:
AIR-6B0		Lee Nguyen	**AIR-6B1**	27 Mar 2018

	Commenter	Section # and Page #	Comment	Suggested Change and Rationale	Disposition
				It is acceptable to issue reactive windshear caution alerts if the forward-looking windshear system is inoperative. **Rationale:** Section 6.4.2 from FAA AC 20-182A reads as follows: *"If you install a forward-looking windshear system on an aircraft that also has a reactive windshear system, you should ensure the reactive windshear system's caution alert is disabled. It is acceptable to issue reactive windshear caution alerts if the forward-looking windshear system is inoperative.* AC 20-182A does not require the reactive windshear caution alert to be disabled if a forward-looking windshear system is inoperative.	
34.	Embraer S.A.	Note 2 of Section	The proposed TSO wording may give the impression that it is requiring	**The text:** *"(2) The simulator should*	Accepted.

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	Commenter	Section # and Page #	Comment	Suggested Change and Rationale	Disposition
		# 4.d (10); page 1-6	activities from the airworthiness approval type certificate applicant (aircraft OEM) or the supplement type certificate (STC) applicant rather than the TSO applicant.	*provide for a pilot in the loop evaluation of guidance flyability during simulated windshear encounters. Guidance command gains should be consistent with those incorporated in the flight guidance system. While "fine turning" of guidance commands to obtain optimum performance for specific airplane may be accomplished, use of unique tailoring for specific airplane may not be necessary. Evaluation through means of a suitable engineering simulation may be acceptable to demonstrate suitability of guidance commands for a representative airplane. However, the manufacturer should demonstrate that the flight guidance commands during a dynamic windshear encounter can be followed without resulting in pilot-induced oscillations."* **Should be changed to:** *(2) The simulator should provide*	Changed as suggested.

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AIR-6B0		Lee Nguyen	**AIR-6B1**	27 Mar 2018

	Commenter	Section # and Page #	Comment	Suggested Change and Rationale	Disposition
				for a pilot in the loop evaluation of guidance flyability during simulated windshear encounters. Guidance command gains should be consistent with those incorporated in the flight guidance system. While"fine tuning" of guidance commands to obtain optimum performance for specific airplane may be accomplished, use of unique tailoring for specific airplane may not be necessary. Evaluation through means of a suitable engineering simulation may be acceptable to demonstrate suitability of guidance commands for a representative airplane. However, the equipment manufacturer should demonstrate that the flight guidance commands during a dynamic windshear encounter can be followed without resulting in pilot-induced oscillations.	